

YINAN ( STEVE ) LIU

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Education

Johns Hopkins University, Robotics	2023.08-2025.05	Baltimore, MD
Monash University, Material Engineering	2016.03-2017.12	4.0 / 4.0
Wuhan University of Technology, Material Engineering	2013.09-2018.01	3.78 / 4.0

Technical Skills

- Skillful in mechanical and statistical softwares: Creo, Solidwork, Comsol, Abaqus, Minitab
- Skillful in robotics applications: ROS, RTDE, Sunrise
- Skillful in programming languages: C, C++, Python, Matlab, Java, CSS, HTML, Keil, CubeMX
- Skillful in electrical layout and simulation softwares: AD, Multisim,
- Skillful in Adobe softwares: PS, AI, AE, PR, DaVinci Resolve

Patents

- Liu, Yinan. 2020. MONOPOLAR SURGICAL APPARATUS. WO/2021/217339, filed Apr. 27, 2020, and issued Nov. 04, 2021.
- Liu, Yinan. 2019. ELECTROSURGICAL SYSTEMS. US/2022/0273360, filed Aug. 07, 2019, and issued Sep. 01, 2022.
- Liu, Yinan. 2022. UNIVERSAL ADAPTOR FOR AN IMAGING DEVICE AND CORRECTOR ASSEMBLY. WO/2023/178631, filed Mar. 25, 2022. Issued Sep. 28, 2023.

Work and Project Experience

Medtronic

<b>Spine Robotics and Optical Navigation System</b>	Shanghai, China
<i>Sr System Verification Engineer</i>	2020.03-2023.07
<ul style="list-style-type: none"><li>• Designed and validated a robotic image correction adapter to make it compatible with more medical imaging devices.</li><li>• Designed and implemented test automation frameworks, as well as performed test automation such as GUI, integration, and stress testing.</li><li>• Built the robotic arm control platform and control system, calibrated the robotic. The absolute accuracy of the calibrated robotic arm can reach 0.7mm.</li><li>• Used Minitab to perform various statistical analyses including ANOVA, t-test, tolerance interval, and Gage R&amp;R.</li><li>• Utilized various mechanical fixtures, metrological device and sensors, and optical trackers e.g., NDI, CMM (Hexagon, Faro, and Zeiss) to collect data and analyze the static and dynamic performances of the robotic system.</li><li>• Familiar with the product of several automation and robotic arm suppliers, e.g., BECKOFF, Stäubli, KUKA, UR, SIASUN (CN), and ROKEA (CN).</li><li>• Familiar with standard test (IEC60601-1, -1-2, GB9706.1, YY0505...etc.).</li></ul>	

<b>Innovative Electro-surgical System</b>	Shanghai, China
<i>Product Engineer</i>	2018.09-2020.03
<ul style="list-style-type: none"><li>• Designed moderately complex electromechanical/mechatronic electrosurgical system and subsystems parts.</li><li>• Developed the pneumatic manifold in the electrosurgical system with Camouzzi, Parker Hannifin, and Bürkert. Formulated a verification plan according to the design requirements to evaluate the function and reliability of the pneumatic subsystem.</li><li>• Evaluated the manufacturability and validated the production line with AME.</li><li>• Developed the control system for valve manifold and the core PID controlling algorithm for the proportional valve.</li><li>• Used Abaqus for two fluid interface interaction simulations. Verified the simulation by a custom setup with a high-speed camera and auto-capture algorithm.</li></ul>	

<b>Ultrasonic Scalpel</b>	Shanghai, China
<i>Associate Product Engineer</i>	2018.01-2018.09
<ul style="list-style-type: none"><li>• Designed core components' mechanical structures (the transducer and the waveguide).</li><li>• Analyzed the piezoelectric effect and thermal effect to optimize product design parameters using COMSOL.</li><li>• Utilized GD&amp;T (Geometric Dimensioning &amp; Tolerancing) systems per ASME standards Y14.5M-1994 and tolerance analysis in 2D and 3D.</li><li>• Utilized product life cycle management software such as Windchill, Agile, and JIRA to document reports.</li><li>• Designed and built prototypes using additive manufacturing techniques, CNC, electrical discharge machining, wire cut and lathe.</li><li>• Assisted senior engineers to design plastic injection mold, optimized parameters for ultrasonic welding, laser welding metal injection molding, and ceramic injection molding.</li></ul>	

<b>Research Project</b>		
<b>Automatic Surgical Robot to Neuro-pixel Insertion</b>	Baltimore America	
Robotic Engineer (Tim Harris Lab @ JHU)	2024.02 – present	
<ul style="list-style-type: none"> <li>Develop a surgical robot solution to automate the Neuro-pixels insertion surgery (approx. 13-16 hrs) with the goal of enabling probe count experiments in rodents.</li> <li>Design the control system for MECA 500 and micromanipulators and optimize the end-effector tooling for craniotomies / durotomies / probe insertion.</li> <li>Developed software relating to user interface for the control system.</li> </ul>		
<b>3D CAD Model Annotation for Neural Network Prediction/Generation</b>	Baltimore America	
Research Assistant (CCVL Lab @ JHU)	2024.01 – present	
<ul style="list-style-type: none"> <li>Use Blender to annotate more than 50<sup>+</sup> categories of 3D CAD models.</li> <li>Use Python script to extract data, and organize and inspect the quality of the annotations.</li> </ul>		
<b>Semi-Supervised Learning with Unlabeled Data in Multi-Organ Segmentation</b>	Baltimore America	
Course Project	2023.9 - 2023.11	
<ul style="list-style-type: none"> <li>Implement <math>\epsilon</math>-<math>\pi</math>-Model and Mean Teacher to leverage unlabeled data in datasets via consistency training.</li> <li>Fine tune SAM to a dedicated medical images model. Use the strong generalization to improve the pre-trained model as pseudo-labels.</li> </ul>		
<b>Avalanche and Landslide Modelling: Flow Dynamics and Force Interaction with Structures</b>	Victoria, Australia	
Research Assistant/ Professor: Dr. Ha Bui	2016.11-2017.02	
<ul style="list-style-type: none"> <li>Applied a mesh-free Smoothed Particle Hydrodynamics (SPH) algorithm due to the limitation of traditional simulation methods in large deformation problems.</li> <li>Evaluated the algorithm predictive capability in MATLAB and optimized the parameters to simulate a scale-down physical experiment of debris flow.</li> <li>Found that SPH could capture the moderately fast flow morphology and trace the changing tendency of impact forces. Solved the underestimation of impact force and unexpected boundary conditions.</li> </ul>		
<b>Synthesis of Two-Dimensional Organic-Inorganic Perovskite and Heterostructures</b>	Victoria, Australia	
Research Assistant / Professor: Dr. Qiaoliang Bao	2017.02-2017.12	
<ul style="list-style-type: none"> <li>Developed two possible synthesis methods for single-unit-cell organic-inorganic halide perovskite.</li> <li>Analysis the material electrical properties of charge transport property and surface potential by AFM.</li> <li>Fabricated an optoelectronic device to analyze the ion migration property of perovskite.</li> </ul>		
<b>Certificates and Awards</b>		
<ul style="list-style-type: none"> <li>Language skills: Chinese (native), English (fluent)</li> <li><i>AWS Certified Solutions Architect – Professional (SAP)</i>, AWS, issued 2021, Credential ID 5M3V4S9JKJREQ6K6</li> <li><i>Project Management Professional, Project Management Institute</i>, issued 2021, Credential ID 3123635</li> <li><i>IEC60601-1&amp;IEC60601-1-2 Training Course</i> IEC60601-1&amp;IEC60601-1-2 Training Course SGS, issued 2022, Credential ID SGS/MED/SHA221014</li> <li><i>Cooperate Awards in Medtronic</i>: <ul style="list-style-type: none"> <li>Best Rookie Award (Top 3 in R&amp;D department), 2018;</li> <li>Innovator Award (Top 1 in Medtronic Technology Center), 2020;</li> <li>Star of the Year Award (Top 10% in Medtronic), 2021;</li> </ul> </li> </ul>		
<b>Other Activities</b>		
<b>‘Angel Loves Science’ (a name of public welfare community)</b>	Shanghai, China	
Instructor & Ambassador & Leader in Shanghai Region	2019.01-2023.07	
<ul style="list-style-type: none"> <li>Lead community volunteers (clinician, engineers, marketers) to design and deliver education sessions to Shanghai Primary Schools, popularize the knowledge of science and its’ application in healthcare.</li> </ul>		
<b>Medtronic Engineering Leadership Council</b>	Shanghai, China	
Workstream Leader in Strategic Capabilities Building	2018.06-2023.07	
<ul style="list-style-type: none"> <li>Lead and organize the leadership development trainings/workshops to enable engineers’ communication, presentation and storytelling skills.</li> </ul>		
<b>Medtronic Product Clinical Evidence Dissemination</b>	Shanghai, China	
R&D Opinion Representative	2018.05-2022.6	
<ul style="list-style-type: none"> <li>Researched more than 300 Medtronic product publications. Investigated the utility of the products in new operations and developed the operation training materials.</li> </ul>		
<b>Monash Human Power Team</b>	Victoria, Australia	
Leader of shell design and manufacturing	2016.05-2017.6	
<ul style="list-style-type: none"> <li>Simulated and designed the shell for the vehicle with regarding to ergonomics and aerodynamics and other engineering factors. Investigated innovative manufacturing method and material to greatly reduce the shell weight.</li> </ul>		